LISTENING AND READING IN LEARNING

Carson Y. Nolan

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Listening and Reading in Learning

Carson Y. Nolan, Director
Department of Educational Research
American Printing House for the Blind

It may strike some of you as peculiar that today I am giving the only paper that does not directly deal with compressed speech. At the American Printing House we have long been interested in compressed speech as a solution to some of the communications problems facing the visually handicapped. A concrete expression of our interest can be found in the report of the first large scale study on the visually handicapped which we carried out jointly with the University of Louisville. Less concrete evidence exists in our several years of collaboration with the American Institute for Research during which we have prepared many of the materials they have required.

The several papers being presented here today deal primarily with the technical and theoretical aspects of the generation of compressed speech and its use. I believe that the information accumulated to date and presented in this meeting justifies the conclusion that application of compressed speech materials can contribute greatly to the education of the visually handicapped and to others. However, study of the history of education shows that development of new and productive educational devices and methods in no way implies that these will ever find their way into application in the classroom or the study behavior of students. It is with this aspect of the problem that we at the American Printing House as manufacturers and distributors are most concerned.

Traditionally, books in braille and large type form have been the primary formal verbal medium for education of the visually handicapped. This tradition is no doubt based on traditions arising in the education of the sighted for whom, during the last five centuries, books have proven to be a permanent, economical and efficient vehicle for education. For many years we have known that printed materials are not particularly efficient communications media for the visually handicapped. Over the last 25 years evidence has accumulated demonstrating that for some curricular areas recordings provide a more efficient medium for communication than do printed materials. Yet, in 1965 fewer than 2% of over 19,000 legally blind students enrolled in grades 1-12 of residential and public schools were reported as using recorded textbook materials as primary means of reading. Therefore, to us it appeared that if educators have been reluctant to capitalize on the advantages stemming from use of auditory materials recorded at normal word rates, it would be optimistic to expect them to jump on the compressed speech bandwagon.

With these things in mind, it seemed to us we could most help the educator of visually handicapped children by supplying him with concrete evidence of the relative usefulness of auditory and written materials. In the event that this evidence supported use of auditory materials at normal word rates, we could best help by exploring and developing techniques for their use in individual study and in the classroom. For the last three years, we have been engaged in such a program of research and development. I would like to describe our progress to you this afternoon.

Our first effort was an exploratory one in which our purpose was to see if variables such as age, intelligence, academic achievement, personal adjustment, etc. were related to the listening ability of the visually handicapped in the same way as has been found for the sighted. The results of this study indicated that they were. The study, which was conducted in a southern residential setting consisted of dual schools for white and negro students, provided an interesting sidelight. Using the STEP Listening Tests as a criterion, negro students, on the average, exhibited a consistent inferiority to white that ranged up to 45 percentile points for one grade. This finding does not present much encouragement to those who might wish to use commonly available auditory materials in attempts to overcome educational deficits for such groups.

In the next phase of our program we compared retention of materials representing the curricular areas of literature, social studies, and science when listening and reading were the means of access. Participating in these studies were a total of 1152 legally blind students from both public and residential school programs. Half this group were braille readers and half were large type readers.. These groups in turn were divided equally between the elementary level (grades 4-6) and the high school level (grades 9-12). Using a complex factorial design, the three studies compared amounts retained when students read or listened to materials once or read or listened on each of three consecutive days.

In general the findings were the same for large type as for braille readers. In the elementary grades listening and reading

resulted in retention of equal amounts of material in every curricular area studied. In the high school grades, no differences in retention for science materials were found between listening and reading groups. However, for both literature and social studies amounts of retention for reading groups was slightly but significantly greater.

In all cases, it took much longer for the groups to read the materials than to listen to them. This was less true for large type readers than for braille. In order to estimate the relative efficiency of each mode of presentation, the retention score of each subject was divided by the amount of time required to read or listen as appropriate. The resulting ratio represented the amount learned per minute of exposure time. When these ratios were compared for the groups, learning by listening proved consistently most efficient. At the high school level, listening proved to be from 183% to 243% more efficient for braille readers and from 155% to 207% for large type readers. At the elementary level, similar ranges were 284% - 360% for braille readers and 190% - 250% for large type readers. It should be obvious that utilization of speech compression would result in even greater efficiency for listening. Further research on this is planned.

Paralleling these studies has been activity directed toward identification of techniques for efficient individual study. For this purpose we have used two approaches: interviews of experienced users of recorded text materials and task analysis of certain aspects of the job of studying when using auditory materials. This information will enable us to write the specifications for a system for study using recorded materials. The system will consist of a work station

including a specially designed player to provide the informational input and a station for appropriate student response. The system development will include the description of techniques for study within the work station. From this point we hope to move to research which will enable us to develop techniques for classroom use of recorded text materials. Included will be attempts to develop techniques for teaching listening in the primary and elementary grades as well as attempts to develop techniques to teach curriculum contents within the classroom context.